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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/823,274      | 03/29/2001  | Walter De Coster     | 859063.491          | 7289             |

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EXAMINER

BROCK II, PAUL E

ART UNIT PAPER NUMBER

2815

DATE MAILED: 12/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/823,274

Applicant(s)

COSTER ET AL.

Examiner

Paul E Brock II

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 13-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 13-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 9 – 12 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected group, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 8. It is noted that claims 9 – 12 have been canceled by the applicant.

### *Drawings*

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the steps of forming a protective coating after the step of forming the insulating material, another implantation of the opposite impurity type, forming another active area, and the first and second trenches extending into the substrate to a second level then forming a second well that extends into the substrate region to the second level must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The statement “wherein performing the first dopant implant is executed after forming the second spacer, the first spacer acting as a mask to allow dopants to extend deeper into the central portion that into the second peripheral portion,” is not understood, because the first spacer is not defined as blocking the second peripheral portion.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

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6. Claims 1 – 4, 7, 8 and 13 – 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Gambino et al. (USPAT 5994202, Gambino).

With regard to claim 1, Gambino discloses in figures 2a – 2i a method of forming an active area surrounded with an insulating area (18a – 18c) in a semiconductor substrate (12). Gambino discloses in figures 2a – 2i forming in the substrate a trench (17a – 17c) surrounding an active area (32a – 32d). Gambino discloses in figures 2a – 2i filling the trench with an insulating material (18a – 18c) to form an edge extending beyond a surface of the substrate at a periphery of the active area. Gambino discloses in figures 2a – 2i forming a spacer (16) at a periphery of said edge. Gambino discloses in figures 2a – 2i and column 9, lines 10 – 26 implanting (19) a dopant in the active area, whereby the implantation in a area located under the spacer is less deep than in the rest of the active area.

With regard to claim 2, Gambino discloses in figures 2a – 2i wherein the spacer has a substantially vertical edge with a thickness that thins down as the distance from said edge increases.

With regard to claim 3, Gambino discloses in figures 2a – 2i wherein the implantation step is followed by a step of removing the spacer.

With regard to claim 4, Gambino discloses in figures 2a – 2i and column 9, lines 10 – 26 wherein the step of removing the spacer is followed by a step of implantation of another active area with a dopant of another conductivity type than that of the dopant.

With regard to claim 7, Gambino discloses in figures 2a – 2i and column 9, lines 1 – 5 wherein the spacer is made of silicon nitride.

With regard to claim 8, Gambino discloses in figures 2a – 2i and column 9, lines 1 – 5 wherein the spacer is made of polysilicon.

With regard to claim 13, Gambino discloses in figures 2a – 2i a method of forming a doped active area in a semiconductor substrate. Gambino discloses in figures 2a – 2i forming first and second insulation areas on a surface of the substrate, the first and second insulation areas being spaced apart from each other and thereby defining a substrate region of the substrate between the first and second insulation areas, the substrate region having a first peripheral portion immediately adjacent to the first insulation area and a central portion spaced apart from the first insulation area. Gambino discloses in figures 2a – 2i forming a first spacer adjacent to the first insulation area and above the first peripheral portion of the substrate region. Gambino discloses in figures 2a – 2i performing, after forming the first spacer, a first dopant implant into the substrate region to create the doped active area, the first spacer acting as a mask to allow dopants to extend deeper into the central portion than into the first peripheral portion.

With regard to claim 14, Gambino discloses in figures 2a – 2i wherein the substrate region has a second peripheral portion immediately adjacent to the second insulation area, the method further comprising forming a second spacer adjacent to the second insulation area and above the second peripheral portion of the substrate region, wherein performing the first dopant implant is executed after forming the second spacer, the first spacer acting as a mask to allow dopants to extend deeper into the central portion than into the second peripheral portion.

With regard to claim 15, Gambino discloses in figures 2a – 2i forming in the substrate first and second trenches on opposite sides of the substrate region, wherein forming the first and

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second insulation areas includes filling the trenches with insulating material and extending the insulating material to a level above a surface of the substrate region.

With regard to claim 16, Gambino discloses in figures 2a – 2i wherein the first dopant implant forms a first well that extends into the substrate region to a first level and the first and second trenches extend into the substrate to a second level, the method further comprising performing a second dopant implant into the substrate region, thereby forming a second well that extends into the substrate region to the second level.

With regard to claim 17, Gambino discloses in figures 2a – 2i wherein the first spacer has a bell shape with a thickness that thins down as the distance from the first insulation area increases.

With regard to claim 18, further comprising: removing the first spacer after performing the first dopant implant; and depositing a first conductive layer (35) on the substrate region.

With regard to claim 19, Gambino discloses in figures 2a – 2i further comprising forming a protective coating (14) directly on the substrate region before forming the first spacer, the first spacer being formed on the protective coating.

With regard to claim 20, Gambino discloses in figures 2a – 2i and column 9, lines 1 – 5 wherein the first spacer is made of silicon nitride.

7. Claims 1, 5 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Gardner et al. (USPAT 6077748, Gardner).

With regard to claim 1, Gardner discloses in figures 2b – 2i a method of forming an active area surrounded with an insulating area (66) in a semiconductor substrate (10). Gardner



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discloses in figures 2b – 2i forming in the substrate a trench (56) surrounding an active area.

Gardner discloses in figures 2b – 2i filling the trench with an insulating material (58) to form an edge extending beyond a surface of the substrate at a periphery of the active area. Gardner

discloses in figures 2b – 2i forming a spacer (84) at a periphery of said edge. Gardner discloses

in figures 2b – 2i implanting (90) a dopant (86) in the active area, whereby the implantation in an area located under the spacer is less deep than in the rest of the active area.

With regard to claim 5, Gardner discloses in figures 2b – 2i a step of forming, at the surface of the active area, a protective coating (68) between the trench filling step and spacer forming step.

With regard to claim 6, Gardner discloses in figures 2b – 2i and column 4, lines 26 – 37 wherein the protective coating results from the thermal growth of a thin silicon oxide layer at the surface of the substrate.

### *Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Omid-Zohoor et al., Segawa et al., Sato, Gonzalez et al., Mandelman et al., Noble, Jr. et al., and Chen et al. all disclose sidewall spacers formed on isolation structures.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul E Brock II whose telephone number is (703)308-6236. The examiner can normally be reached on 8:30 AM-5:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703)308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Paul E Brock II  
December 2, 2002



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